## PROCEEDINGS

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## JAPYGIDAE OF NORTH AMERICA 7. A NEW GENUS IN THE PROVALLJAPYGINAE FROM MISSOURI

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In 1936, while conducting a survey of insects in the soil of peach orchards, W. F. Turner collected a single specimen of a species of japygid which presents so many unique features that it seems worth-while to record its existence. This specimen, which I shall call Eojapyx pedis has plumose body setae and other characters which place it in the subfamily Provalljapyginae. The characteristic of plumose body setae is found only in this subfamily and in the subfamily Evalljapyginae. No specimens of either subfamily have ever been found east of the Rocky Mountains, but are common along the Pacific Coast and in Mexico. The specimen of E. pedis was collected in Stoddard County, Missouri, at least a thousand miles east of its near relatives.

During the soil survey of peach orchards, several thousand specimens of Parajapyx isabellae (Gr.) as well as a few specimens of Metajapyx subterraneus (Packard) were taken. This points out the magnitude of the survey and the efficiency of collecting japygids. The capture of a single specimen of $E$. pedis therefore poses a question. It might be assumed that E. pedis represents a recent introduction from the Pacific Coast, especially since Stoddard County lies in the lowlands bordering the Mississippi River and therefore contiguous to marine commerce. However, anatomically, no counterparts of $E$. pedis have been found on the Pacific Coast.

The mandibles of $E$. pedis bear a resemblance to the mandibles of $P$. isabellae (Gr.) in that there are three major teeth with small secondary teeth between them. The setae in the male setose sac in the third sternite resemble those of some
species of Nanojapyx but are more advanced in evolution. It is possible that each of the large brush-like setae is glandular and connected by a thin sclerotized duct to a glandular, secreting cell which lies farther back in the sac, and that the enlargement on the duct is a point of attachment. Some undescribed species of Nanojapyx in the writer's collection appear to indicate such a structure. The tarsi of E. pedis have two modified setae which arise ventrally, near the pretarsus and project between the tarsal claws. Somewhat similar setae are found on Parajapyx (Grassiapyx) ambiguous Pages, and they are reminiscent of setae on the tarsi of certain campodeids such as Metriocampa and Campodea. In recognition of this character the species is named pedis (foot) and the genus from eos (east) since it occurs far east of its nearest relatives.

Eojapyx, new genus
Type species: Eojapyx pedis L. Smith.
Small, under 0.4 mm long, body with many plumose setae, mandible with three large teeth bearing smaller accessory teeth or inner margin, antennae with 22 segments in type species, terminal segment of antenna with eight conspicuous placoid sensillae, legs relatively short, apical ventral setae on tarsi modified, tarsal claws equal, median claw prominent and curved, plumose setae in male sac large and with many pinnules (as illustrated) forceps nearly symmetrical, long, slender with a few basal teeth, pygidium rounded, prominent, all styli with two setae.

The genus Eojapyx is related to the genus Nanojapyx but is distinguished by the accessory teeth on the mandible, by the modified tarsal setae which project between the tarsal claws, by the smooth forceps with basal teeth only, by eight placoid sensillae on the terminal antennal segment (whereas Nanojapyx has only six), and by having two setae on each stylus (whereas Nanojapyx has only one on each ).

Eojapyx pedis, new species
Male: Head: Antenna with 22 segments, trichobothria ${ }^{1}$ typical, onethird longer than longest adjacent seta, ultimate segment slightly longer than wide, with eight placoid sensillae in an irregular whorl, each sensillum pear-shaped and recessed into a pocket, segment seven dorsal half with an irregular row of ten setae, ventrally two irregular rows of nine

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and eight setae each, segment twenty with two irregular whorls of 20 setae each, dorsum of head with four transverse rows of setae, about ten setae per row $M$ alternating with $m$ in the row, $M$ with one or two pinnules, labrum with five hyaline sensory cones at tip, and 11 setae of which the median basal pair longer than the others, maxillary palpus three times as long as wide with seven setae near tip, thumb of galea with five projections, lacinia with four pectinate branches, the fifth or distal branch reduced to a slender rod, two-thirds as long as the adjacent branch, mandible with three prominent teeth, between the ventral and median teeth, four small accessory teeth; between the median tooth and dorsal tooth, six accessory teeth; thin membraneous prostheca present, labial palpi slightly clavate, three times as long as wide with two long apical setae and two shorter, subapical setae, protrusible pouches on labium typical.

Thorax: Pronotum with $7+7 \mathrm{M}$ and $5+5 \mathrm{~m}$, mesonotum and metanotum prescutum $1+1 \mathrm{M}$ and no m , scutum with $10+10 \mathrm{M}$ and $2+2 \mathrm{~m}$, $\mathrm{L}_{2}$ twice as long as greatest width of pronotum, dorsal apex of femur of all legs with a close row of three setae, of which anterior plumose, longest, the others simple, subequal, tibia $\mathrm{L}_{3}$ with two stout, plumose setae (calcaria?) and 16 simple setae, tarsal claws subequal with median claw prominent, bent as a right angle, two long ventral setae with hooked ends project between tarsal claws, two large ventral setae per row on tarsus.

Abdomen: Tergite I prescutum 2 M and no m , scutum $7+7 \mathrm{M}$ with three to five coarse pinnules, and $6+6 \mathrm{~m}$, sternite I with an irregular row of $9+9$ small plumose setae anterior to subcoxal organs and within the limits of the styli; lateral subcoxal organs extending from near the styli to near the mid line, with one posterior row of $6+6$ slender plumose sensory setae with large sockets, and one irregular row of glandular setae $13+15$ half as long as sensory setae and anterior to sensory setae; median subcoxal organ absent, all styli with a slight secondary cone and two basal setae with laterad seta two and one-half times the length of mesad seta, and a basal pore between the setal sockets; tergite II with $17+17$ plumose setae of various sizes with two to six pinnules $3+4$ simple setae, pleuron II prepleurite with 2 M and one large m , pleurite anterior to posterior $2 \mathrm{M}, \mathrm{m}, \mathrm{M}, \mathrm{m}$, and small m, sternum II apotome with a single row of $7+7$ plumose setae alternating large and smaller, becoming smaller medially, sternite with $25+25 \mathrm{M}$ with three to five stout pinnules, tergite III $24+24$ plumose setae of various sizes and $4+4$ simple setae, pleuron as in segment II, sternum III apotome as in segment II, sternite with opening of male setose sac surrounded by 22 short, stout plumose setae, plumose sac with $9+9$ large brush-like plumose setae inside in a single row, each seta connected with a slender twisted rod with an enlargement near base of seta, segments IV to VII similar to segment II, postero-lateral angles of tergite VII not projected to rear, pleurae normal, segment VIII slightly carinate dorsally with $7+7 \mathrm{M}$ and $5+5 \mathrm{~m}$ between carinae, sternum VIII with $9+2+9 \mathrm{M}$ and $9+9 \mathrm{~m}$, gential arifice oval surrounded by a ring of sixteen simple short setae, gential palpi absent, segment IX with
$3+3 \mathrm{M}$ dorsally, alternating with $3+3$ simple setae half as long as the M, segment IX ventrally with $3+3 \mathrm{M}$ alternating with $3+3 \mathrm{~m}$, tergite X between carinae $4+1+4 \mathrm{M}$ and four large simple setae along posterior edge, no setae in rectum, pygidium prominent, rounded, equal in length to stylus IV, segment X width 0.20 mm , length 0.25 mm , forceps nearly bilaterally symmetrical, slender, nearly straight, denticles biserial, located in basal fourth of forceps, left arm upper row three minute teeth lower row three slightly larger teeth, right arm upper row three minute denticles, lower row three slightly larger teeth, inner edge of both forceps straight, smooth, without crenulations, tips of forceps slightly curved; length of body including forceps 3.46 mm , length of forceps 0.17 mm , length of $L_{3} 0.36 \mathrm{~mm}$.

Female: Unknown.
Type: One male on a microslide with the label: Peach Orchard Survey, Stoddard County, Missouri, 25 September 1936. From W. F. Turner. T-1201, Lot 37-2482.

Type deposited in U. S. National Museum.
William F. Turner (personal communication) has supplied the following information: "Soil samples were collected from at least 10 different locations in an orchard. These samples were then thoroughly mixed before being introduced into the Berlese funnels. It was very seldom that any samples were taken at the very edge of an orchard. In any case, the samples in question were collected within 2 feet of the trunks of peach trees, and samples were not taken over 6 to 8 inches deep. The soil in the orchard was listed according to the U. S. Soil Surveys as Memphis silt loam. The top 10 to 12 inches was a brown silt (loess). This orchard was on the top of Crowley's ridge, which arises in southeast Missouri and runs south almost to the Louisiana line in Arkansas. The orchard had not been cultivated prior to harvest and the notes state that it was grown up in such weeds as Solidago, Aster, Smilax, Eupatorium, and blackberry, but that there was very little grass in the orchard. Under such circumstances the weed growth is, of course, much lighter under the trees than it is between trees. Nevertheless, there would be a considerable amount of such growth even to within 2 feet of the trunks of the trees. The soil was quite moist, it having rained just 2 days prior to the time when the soil collection was made."

In many specimens some setae may be missing. The types of missing seta, that is whether simple or plumose, can be inferred from the setal socket. Simple setae have simple, circular setal sockets whereas plumose setae have circular setal sockets with inner sclerotization leaving a Ushaped opening in which the seta may move backwards or forwards only. This generalization holds for body setae (but not setae on the head or appendages) in the Evalljapyginae as well as the Provalljapyginae.

The gut contents of the specimen are amorphous and show no insect or mite parts. The delicate structure of the mandibles may indicate that this species has abandoned the predatory habit completely. The absence
of such specimens from all japygid collections which I have examined suggests that they normally occur at considerable depths in the soil.

## Explanation of Figures

All figures are of Eojapyx pedis L. Smith from male specimen cleared, stained and mounted in balsam.

Fig. 1.-Dorsal view of tenth segment and forceps with all setae between carinae shown, and all other setae omitted, $\mathrm{e}=0.15 \mathrm{~mm}$.

Fig. 2.-Lateral view of metatarsus, $\mathrm{e}=0.048 \mathrm{~mm}$.
Fig. 3.-Lateral view of pleuron II showing prepleurite and pleurite, $\mathrm{e}=0.084 \mathrm{~mm}$.

Fig. 4.-Dorsal view of terminal antennal segment showing 8 placoid sensillae. All setae omitted, $e=0.028 \mathrm{~mm}$.

Fig. 5.-Dorsal view of placoid sensilla, $\mathrm{e}=0.001 \mathrm{~mm}$.
Fig. 6.-Lateral view of placoid sensilla, $e=0.001 \mathrm{~mm}$.
Fig. 7.-Ventral view of male setose sac, $e=0.053 \mathrm{~mm}$.
Fig. 8.-Ventro-median view of left mandible with prostheca, e $=$ 0.015 mm .


[^0]:    ${ }^{1}$ Abbreviations and terms: $\mathrm{M}=$ plumose setae, generally large; $\mathrm{m}=$ simple setae, generally smaller; trichobothria $=$ special sense-setae on antennal segments IV-VI; $\mathrm{L}_{3}=$ metathoracic leg; pleuron composed of prepleurite situated anterior to the pleurite; carinae $=$ laterad lines of sclerotization on dorsum of segment X; Acropygidium $=$ mid-dorsal projection of segment X to the rear; apotome $=$ anterior sclerite of an abdominal sternum.

